

EMGT 835 FIELD PROJECT

**A NEW PROJECT EXECUTION METHODOLOGY; INTEGRATING PROJECT
MANAGEMENT PRINCIPLES WITH QUALITY PROJECT EXECUTION
METHODOLOGIES.**

By

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EXECUTIVE SUMMARY

On an annual basis, there are numerous reports in regards to a particular company or function's inability to execute on a large number of projects. The reasons vary widely from a lack of an initial understanding of what the customer was really looking for to a product's failure to receive final testing approval. Numerous methodologies have been proposed over the years to improve an organization's ability to execute a project/solution successfully with mixed successes depending on the business and methodology adopted.

This field project theorizes that while all the methodologies deliver a significant amount of knowledge and useful tools, they all fall short in delivering a complete *Project Execution Methodology*. Therefore, the proposed *Project Execution Methodology* will bring together the best of both worlds. The voice of the customer and data driven decision making of the quality methodologies and the rigorous discipline of managing all aspects of a project delivered by the project management methodology. Additionally, this new methodology can pick and choose from different tools across methodologies without having to maintain a “theme” relative to a particular function such as Quality and Project Management.

The field project starts with an introduction and discussion of the Deming Principles, Six Sigma Methodology, Information Technology Infrastructure Library and Project Management Institute Book of Knowledge. The field project then utilizes these methodologies to build out a new

methodology that can be utilized across businesses and organizations to dramatically improve the execution success of a project. By leveraging multiple methodologies with different approaches to solving a business problem, the new methodology can deliver a more comprehensive approach that attacks a project from both a technical and “administrative” perspective. The technical side being the creation/documentation of customer requirements, design of a solution and the formalized “guarantee” that the solution then meets these requirements. The administrative side being the management of scope, schedule, budget and risks in a way that insures the solution is delivered successfully in the eyes of business. I.E., the technical side insures a solution is delivered that the customer will buy and the administrative side insures the solutions is paid for by the business.

INTRODUCTION

The project has finished and the solution is delivered. Unfortunately, the customer isn't satisfied. Customer satisfaction, tied to providing what the customer wants when the customer wants it, is important to grow a business year-over-year. Finding out after delivering the product that it doesn't meet key needs is too late. It isn't enough to build a product; the end result should be to deliver a solution.

There are several schools of thought on achieving the best value-added solution. From Deming's statistical theories on total quality management to the Six Sigma acronyms of tools and techniques to project management's body of knowledge to manage the life cycle phases to the texts supporting customizable frameworks; there is no shortage of approaches embraced by industry. Understanding the appropriate course of action for each project objective is important to ensure a success.

There is great difficulty in identifying and effectively applying the appropriate management techniques to successfully deliver a solution. As no one methodology appears to tackle all risk elements encountered during a project's life cycle, project managers' often find they are unable to balance the schedule with the budget to meet the customer requirements.

LITERATURE REVIEW

In order to insure a comprehensive review, the following websites were utilized in conducting a literature review: Amazon.com, Google, Live and the PMI.org. While it was fairly easy to find books, websites and articles on the individual methodologies, it was difficult to find any documentation on the integration of any project management methodologies with quality methodologies. However, the author did manage to find a number of detailed articles on the integration as well as some books on the specific quality methodologies. In the end, for the “original thought” portion of this field project and to develop the “complete” methodology, I relied on a handful of websites, peer discussions and my own personal experience to develop this topic. An evaluation of several books and websites used for the research is described below:

B o o k s

Richard Perrin. 2008. *Real-World Project Management Beyond Conventional Wisdom, Best Practices, and Project Methodologies*. John Wiley & Sons, Inc.

The author of this book is PMP certified and a former instructor for the Project Management Institute (PMI). However, the book does an outstanding job of discussing both the positive and negatives of the PMBoK as well as the beginning incorporation of other quality, risk and financial methodologies that are missed in the current PMI publications. Additionally, the book contains multiple examples of failed projects, fantastic leadership quotes about the art of

managing a project and numerous steps towards the creation of the *Project Execution Methodology*.

Neuendor, Steve. 2004. *Six Sigma for Project Managers*. Management Concepts, Inc.

The main purpose of this book is to introduce Six Sigma to the project management function and then propose how Six Sigma can help improve the function; it did not integrate the two methodologies. The author provides a fairly rudimentary introduction to Six Sigma, but falls very short of providing a cohesive description of Six Sigma from an overall methodology and improvement project process. Additionally, his “integration” of Six Sigma with project management principles is fairly weak in that he spends 7 chapters talking about Six Sigma and 1 on project management. As mentioned previously, the chapter on Six Sigma and project management focuses is on how Six Sigma can improve the “process” of project management and not on how the two methodologies can support each other in the project execution process.

Peter S. Pande, Robert P. Neuman, Roland R. Cavanagh. 2000. *The Six Sigma Way*. The McGraw Hill Companies Inc.

This book actually serves 3 purposes; (1) To provide an executive overview of Six Sigma for an executive and give some practical examples of what can be accomplished by applying Six Sigma., (2) How to tailor Six Sigma for your particular organization and how to apply it quickly and efficiently., and (3) A detailed roadmap on how to roll-out Six Sigma to an organization for quick

adoption and a high return on your investment. The author(s) have created a fantastic book that is both statistically accurate and business relevant. The highlights of the book are its use of business examples to reinforce the use Six Sigma, the comprehensive executive overview and how it is organized into more a user's reference manual for Six Sigma implementation. However, the book does not further the application of Six Sigma by applying any project management principles as it is purely a Six Sigma book.

Harold Kerzner, Ph.D. 1995. *Project Management A Systems Approach to Planning, Scheduling, and Controlling*. Van Nostrand Reinhold.

While this book was published over 10 years ago, it is extremely comprehensive in its discussion of project management tools and all areas, including quality, that impact the execution of a project. The book does not discuss integrating the methodologies, but it does at least provide historical overviews and how many of these methodologies are applied. As the book is well over 1,000 pages, it is not a quick read and should only be used to answer specific project management questions after one has developed a fairly deep understanding of the subject.

John M. Ivancevich, Peter Lorenzi, Steven J. Skinner, Philip B. Crosby. 1994. *Management Quality and Competitiveness*. Richard D. Irwin, Inc.

While this was the oldest book reviewed, it provided a completely different context to all other articles and books reviewed. The authors approached project execution from an evolutionary

perspective discussing the history that has lead to the current management approach in business. The book delivers a great historical review in the part entitled The Evolution of Management as well as subsequent chapters and sections of the book on leadership, organizational structure and technology/innovation. Once again, a fantastic reference book that goes above and beyond discussing the methodologies and it the historical roots of business management.

Den Boer, Sven. 2006. *Six Sigma for IT Management*. Van Haren Publishing.

The main purpose of this book is to both introduce Six Sigma and Information Technology Infrastructure Library (ITIL) and then integrate the two methodologies for application on an Information Technology (IT) project. The author provides an adequate upper level review of Six Sigma basics as well as a detailed review of ITIL. Furthermore, the author spends considerable time discussing how to integrate the two methodologies as well as providing both positive and negative and case studies; an enormous plus for this book. Finally, the author validates a tenet of this paper that applying the tools of multiple methodologies in a thoughtful and cohesive manor will deliver improved results over just using a single methodology. A great book for the IT project manager's initiating a Six Sigma program or Six Sigma professionals working in the IT profession.

Project Management Institute. 2004. *A Guide to the Project Management Body of Knowledge Third Edition*. Project Management Institute, Inc.

The “sole” purpose of this book is to fully outline and introduce the details behind the Project Management Institute’s process for managing a project. The book is both a study guide for the PMI exam and a reference guide for new and experienced project manager to utilize in managing large, medium and small projects. This is the de facto standard in project management principles and a must read for any aspiring project management professional. The book is a fantastic reference manual on all things PM and is very detailed on how to appropriately manage any project. Of course, the missing link is any reference to any type of technical development and/or quality methodology that is necessary to deliver a customer valued solution. The PMI model “guarantees” a project on scope, schedule, budget and with risk management; it does not “guarantee” a solution the customer will love.

Articles

Gack, Gary A. 2008. Six Sigma and the Project Management Body of Knowledge. iSixSigma LLC. <http://software.isixsigma.com/library/content/c040721b.asp>

The purpose of this article was to begin the development of the thought that an integrated methodology of Six Sigma and the Project Management Principles can improve your project’s results. As it is an article, the author devotes no time to introducing either methodology, but focuses on the integration of the methodologies. The author takes the approach that the Six Sigma methodology is an adequate supporting tool set for the project management methodology, but cannot stand alone as a project execution methodology. Additionally, he does not feel Six Sigma is

an end to end methodology for project execution. While in theory his assessment is correct, I feel he misses the mark on the true value of integrating Six Sigma and the PMBoK. However, it is a good introduction to this topic and is a thoughtful discussion.

Zucker, Daniel. 2008. *Integrating Project Management into Six Sigma*. iSixSigma LLC. <http://www.isixsigma.com/library/content/c070423a.asp>

The purpose of this article is to discuss the integration of Six Sigma and Project Management Principles. The author truly initiates a discussion where Six Sigma and project management methodologies are on equal grounds and that an integration of both tool sets can be extremely advantageous. While it is only an article and not a full-on paper discussing how the integration could happen, it is a great beginning. The article has an outstanding graphic that is a good “snapshot” of a possible integration of both methodologies.

Jones, Stephen H. 2008. *Better Project Management Performance with Six Sigma*. iSixSigma LLC. <http://www.isixsigma.com/library/content/c060102a.asp>

The purpose of this article is to discuss the integration of the design for Six Sigma methodology and the Project Management Principles. The article and author deviate from the standard Six Sigma define/measure/analyze/improve/control (DMAIC) framework and discusses Six Sigma from a design for Six Sigma (DFSS) perspective. As the article does not give a detailed explanation of DFSS, I will devote a few sentences to this “other” Six Sigma methodology. DFSS

moves the Six Sigma statistical tool-set from the process improvement projects to the design projects. DFSS works to apply statistical analysis to the upfront design requirements to insure they are correctly described and can be met with Six Sigma rigor in the verification, validation and factory test phases of the project. This is an interesting twist on integration and does require some consideration in the area of new product development. However, the concept of integration between Six Sigma and project management is identical; but he does reference some Six Sigma design tools that should be considered when dealing with more technical design projects.

W e b s i t e s

Office of Commerce Government, England. 2007. www.itil-officialsite.com. The APM Group Ltd.

The official website of the Information Technology Infrastructure Library (ITIL) is www.itil-officialsite.com. This organization is actually funded by the United Kingdom Government and is the de facto standard of IT project execution throughout the globe. The organization just recently release version 3.0 of the lifecycle and it now compromises 5 volumes with each volume being devoted to the individual areas of ITIL; Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. While this documentation is extremely comprehensive, it is also extremely expensive at 300 British Pounds before shipping and handling. Therefore, all ITIL information contained within the field project was developed through interviews of employees at the Acme IT Company.

QUALITY PROJECT METHODOLOGIES

The Deming Approach

W. Edwards Deming was the preeminent voice for the quality movement and his 14 point approach to total quality management is known the world-over as key to transforming business effectiveness. He is best known for his work in Japan, which commenced in 1950, and created a post-war revolution in quality and economic production.

Mr. Deming believed that no one piece of his 14 point approach could be separated from the whole. The implementation required an ‘all or nothing’ deployment into the business to yield success. The 14 principles of Deming’s approach (John M. Ivancevich 1994) are:

1. Create process consistencies with improvements of products and services. The aim is to deliver on quality and operational excellence.
2. Adopt the cooperative philosophy of win-win throughout the organization, customers and stakeholders.
3. Cease dependence on mass inspection to achieve quality. Instead, improve the process and build quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag alone. Instead, minimize total cost in the long run. Move toward a single supplier for any one item, based on a long-term relationship of loyalty and trust.
5. Constantly improve the processes surrounding production, services and planning. This will improve quality and productivity and will decrease costs.

6. Provide venues for training and skill building.
7. Adopt and embrace leadership skills for the management of resources. It is important to recognize the different abilities, capabilities, and aspirations in doing resource management.
8. Drive out fear and build trust.
9. Break down barriers between and within departments. Everyone must work as a team to foresee problems that might be encountered – risk management techniques are essential.
10. Eliminate slogans, exhortations, and targets asking for zero defects or new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
11. Substitute the evolution of leadership skill building for the elimination of numerical goals, numerical quotas and management by objectives.
12. Understand and remove barriers that hinder people in the joy in performing their job.
13. Implement a program of education and self-improvement.
14. Ensure that everybody in the company is working to accomplish the transformation.

The keys of Walter Shewhart's Plan-Do-Check-Act cycle (John M. Ivancevich 1994) were revised by Deming as the "Plan-Do-Study-Act" (PDSA) cycle which Deming (John M. Ivancevich 1994) believed better described his approach and which inspired the fundamentals of Six Sigma.

PLAN: Define the objectives and processes necessary to deliver results in accordance with the specifications.

DO: Implement the planned processes.

STUDY: Monitor and evaluate the processes and results against objectives and Specifications.

Report the outcomes.

ACT: Apply improvement actions to outcomes, as necessary. This means reviewing all steps (Plan, Do, Study, Act) and modifying the process to improve it before its next implementation.

The Six Sigma Approach

There are two key methodologies within Six Sigma: DMAIC and DMADV. DMAIC is used to improve an existing business process, and DMADV is used to create new product or process designs for predictable, defect-free performance. (Peter S. Pande 2000)

DMAIC methodology consists of the following five steps:

- **Define** the process improvement goals that are consistent with customer demands and enterprise strategy;
- **Measure** the current process and collect relevant data for future comparison;
- **Analyze** to verify relationship and causality of factors. Determine what the relationship is, and attempt to ensure that all factors have been considered;
- **Improve** or optimize the process based upon the analysis using techniques like Design of Experiments; and
- **Control** to ensure that any variances are corrected before they result in defects. Set up pilot runs to establish process capability, transition to production and thereafter continuously measure the process and institute control mechanisms.

Some businesses have used DMAICR (Realize) (Peter S. Pande 2000) as a focus of benefits realized by the business from the delivered solution. It is important to not focus solely on financial gains realized using the Six Sigma approach as this is counter-productive since financial gains are simply by-products of good process improvements.

DMADV methodology consists of the following five steps:

- **Define** the goals of the design activity that are consistent with customer demands and enterprise strategy;
- **Measure** and identify CTQs (critical to qualities), product capabilities, production process capability, and risk assessments;
- **Analyze** to develop and design alternatives, create high-level design and evaluate design capability to select the best design;
- **Design** details, optimize the design, and plan for design verification. This phase may require simulations; and
- **Verify** the design, set up pilot runs, implement production process and handover to process owners.

The core of the Six Sigma methodology is a data-driven, systematic approach to problem solving, with a focus on customer impact and satisfaction. Statistical tools and analysis are used in the process, but it would be a mistake to view the Six Sigma methodology as purely statistical, as it is acceptable to define a Six Sigma project using only a few tools and data analysis. The

tools used by Six Sigma methodology have been around a long time and are actually a subset of the Quality Engineering discipline. The goal of Six Sigma is to use quality-based tools to produce a greater effect than a sum-of-parts approach.

The ITIL Approach

Created by the United Kingdom's Central Computer and Telecommunications Agency (CCTA), the ITIL or Information Technology Infrastructure Library (Office of Commerce Government 2007) is a globally recognized collection of best practices for information technology service management. The growth in using information technology to meet business needs inspired the development of ITIL. This approach is intended to support businesses to customize a framework to achieve quality solutions to overcome the difficulties associated with growing IT systems.

The ITIL encompasses a series of texts or documents each covering a core practice of IT Management. The ITIL texts have been consolidated into logical 'sets' grouped by related process guidelines for the different aspects of IT management, applications and services. The 5 core texts forming the foundation of ITIL v3 (**Office of Commerce Government 2007**) are:

1. Service Strategy
2. Service Design
3. Service Transition
4. Service Operation
5. Continual Service Improvement

Proponents of ITIL approach state that a primary benefit is ITIL's provision of common vocabulary, which includes a glossary of strictly defined terms. ITIL v3 has a new and enhanced glossary.

Quality Project Methodologies Summary

The summary looks at advantages, disadvantages and opportunities associated with using these quality improvement methodologies. Additionally, the concept of a more integrated project execution methodology will be discussed.

The Deming Principles (John M. Ivancevich 1994) are considered by many the foundation of all quality improvement methodologies. The Plan, Do, Study and Act approach to problem solving was not new, but Deming's results in Japan and his rigorous approach paved the way for future quality methodologies. Above all else, the Deming Principles established the basic premise that everything, at least manufacturing ... which was everything in the era of the Industrial revolution, was a process and that through the utilization of a quality methodology, this process could be improved and controlled.

The Six Sigma Methodology took the Deming Principles a step further by adding a statistical tool-set that assisted in the analysis, improvement and control of a "typical" process problem. Over time, "Six Sigma" companies have added change management tools, statistical design tools to move the Six Sigma rigor into the initial design process and voice of the customer. This voice of

the customer has distinguished the Six Sigma Methodology from other methodologies in its ability to deliver results that impact the customer and the ultimate value of the improvement.

While a large amount of time was not spent discussing ITIL, it is a natural step in the progression of the quality improvement methodology. As business and society have moved from the industrial revolution to the information “revolution”, the processes that involve information and the technology associated with it have become more and more critical. One needs to look no further than Wall Street and the market value of Microsoft, Google and Amazon to see the tremendous value business places information. The ITIL methodology treats the management of information as a process that requires analysis, improvement and control to efficiently and effectively run a business.

In conclusion, the aforementioned quality improvement methodologies advocate utilizing voice of a customer (VOC) to initiate a project that then translates this VOC into opportunities / requirements that can be analyzed, improved and controlled for increased business value.

PROJECT MANAGEMENT METHODOLOGY

First published in the 1980's as a white paper by the Project Management Institute (PMI) (Project Management Institute 2004), the Project Management Book of Knowledge Guide (PMBOK) is an attempt to standardize existing generally acceptable and fundamental project management best practices and techniques into a central source.

The PMBOK identifies 5 basic process groups and 9 knowledge-base areas that are usually found in projects. The 5 basic process groups include:

1. Initiating;
2. Planning;
3. Executing;
4. Controlling & Monitoring; and
5. Closing

The 9 project management knowledge-base areas are:

1. Integration;
2. Scope;
3. Time;
4. Cost;
5. Quality;
6. Human Resources;

- 7. Communications;
- 8. Risk; and
- 9. Procurement

A project has a defined set of activities that use resources to meet those pre-defined objectives. Ensuring that the resulting solution is delivered within the pre-defined constraints is the first hurdle of project management. The second, more ambitious challenge is the optimized allocation and integration of the resources needed to meet the project objectives and thus add value.

Project Management is the discipline of organizing and managing resources to ensure that a project is completed within defined scope, schedule and cost constraints, as well as ensuring the quality of the delivered solution. A project considered temporary to create a unique solution, which brings about beneficial desired change or added value.

Project Management Methodology Summary

In summary, the Project Management Methodology takes on the challenge of tackling the “non-technical” aspects of a project that usually derail a well intended and planned project ... the management of that effort! Unfortunately, a large number of engineers and quality project methodology advocates overlook this critical function as an overhead administrative function that adds little value. This perception has led to projects missing deadlines, overshooting budgets, knee jerk reactions to “unforeseen” foreseeable events and solutions that do not meet customer expectations. While other methodologies focus on the solution the problem, the Project

Management Methodology focuses on the delivery of that solution. The Project Management Methodology is the tool-set for managing the scope, schedule, budget and risk associated with delivering any solution.

THE PROJECT EXECUTION METHODOLOGY

The *Project Execution Methodology* is built upon the PMI Methodology (Project Management Institute 2004) and the Quality Methodologies (John M. Ivancevich 1994) discussed thus far. The integration of these methodologies is a natural progression of work initiated by Richard Perrin in the book *Real-World Project Management* (Perrin 2008) and Daniel Zucker in the iSixSigma article *Integrating Project Management into Six Sigma* (Zucker 2008). The concept is furthered in this field project, by calling out specific tools and processes from the individual methodologies that could aide a project manager in achieving success in the execution of a project. The *Project Execution Methodology* combines best practice principles that, when applied, will ensure effective execution of projects. This methodology can be applied to any project because it addresses the core fundamentals within each phase of a project: Schedule, Budget and Scope. Ensuring these elements are within acceptable risk parameters will allow for the delivery of a quality solution. By using the *Project Execution Methodology*, a project can mature from building a product into delivering a solution.

It is important that businesses make money commensurate with the value provided to its customers. The thought of ‘build it and they must buy it’ isn’t going to grow a business year-over-year. Focusing on and clearly defining the customer requirements, then building solutions with the creative flare of a business’s talent will ensure products are in fact the solution.

Focusing on defining customer satisfaction characteristics (a/k/a requirements) upfront in the project and then continually measuring their processes will ensure the delivered product is the desired solution.

By integrating the aforementioned methodologies, a PM gets the best of all worlds; delivering a solution that meets customer requirements and delivers value to both the customer and the business. Therefore, we propose the following Project Execution Methodology:

Figure 1. Company X Project Execution Methodology Tollgates

While each methodology has a specific set of strengths in every phase, by utilizing the best practices of each, one can formulate an ironclad execution process. Therefore, the following “lifting” of tools from each methodology is proposed:

DMAIC:

1. Utilize the voice of customer to get an upfront understanding of their wants.
2. Insure key process indicators are documented, baseline and target set as the ultimate measure of success.
3. Initiate failure modes and effects analysis during design to insure a solid solution.
4. Institute control mechanism(s) to insure long term viability of the solution.

PMI:

1. Leverage the plan, budget and scope management rigor throughout the project.
2. Insure a pro-active approach to project issues by driving risk management.
3. Grow the collective knowledge of the PM community by utilizing good project closure techniques.

ITIL:

1. Understand the true business strategy and how it applies to project success.
2. Transition the developed solution into the business's operating systems.
3. Realize the need to continuously re-evaluate the “final” solution for further improvement.

To fully illustrate the power of combining these methodologies into the *Project Execution Methodology*, a fictional project has been created will be used as the discussion subject for how the new methodology supports the critical steps required for successful execution. For ease of discussion, the project will be broken into three execution stages. These stages will be the Planning, Development and Operate stages that best depict the entire life cycle that a solution must endure to be deemed successful. The focus of our project will be the development of a widget that can be sold in the consumer market with the overarching requirement of reducing the “inconvenience” of acquiring a movie for in-home viewing.

P l a n n i n g

In the initial Planning stage of our project, we will incorporate the following key aspects:

Utilize the voice of customer to get an upfront understanding of their wants. By utilizing this key Six Sigma tool, we can develop a clear definition of “inconvenience” and what that means to our customer. The definition would include detail key process indicators that are articulated in requirements of what our customer would like to see improved. These could include the amount of time required to acquire the movie, media that delivers the movie and size of that media, cost of the acquisition and rental verses buy time to name a few.

Insure key process indicators are documented, baseline and target set as the ultimate measure of success. This Six Sigma tool entails determine exact limits on what will and will not make the customer happy. This is the next step in understanding the VOC, developing specifications around the requirements so that the development team knows what success looks

like and what needs to be tested to prove it. The step also includes some initial hypothesis testing to set the success measures and further reduce the upper level requirements in detailed functional requirements.

Leverage the plan, budget and scope management rigor throughout the project. While this PMI step is not a one-time only step, it is critically important in the beginning to step the stage for what needs to be accomplished. The step serves two purposes, (1) setting expectations with sales and marketing on what the project team needs to deliver in terms of scope, time frame and cost (both overall project and solution cost), and (2) setting expectations with the project team on what is required in terms of schedule, scope and budget for this solution to yield optimal value to the business. This step will be repeated regularly throughout the project and with the purpose of re-iterating both expectations. A note should be made that this step mentions nothing of the actual widget; hence engineers thinking it is administrative, but it is critical in establishing and maintaining a “contract” between the business and the project team.

Understand the true business strategy and how it applies to project success. This ITIL “tool” drives at the responsibility that lies outside the project team with the business sponsor. Does the development of this widget further the overall business strategy? If part of the company sells DVD’s or owns movie theatres, does the development of this widget “steal” revenue or detract from that focus? Does the development of this widget create a “silo” with another business function that will create an internal dispute?

It is critical that the project team leave this phase with an executable plan and requirements that fully articulate what successes looks like for their widget. It is also critical that the project team continuously communicate with their business partner via specific meetings called tollgates. These tollgates are specific points in time that stakeholders must meet and agree that the project is in a condition that warrants the continued consumptions of resources and that it is on a path to success. A successful exit of this stage for the project team delivers a budget that is +/- 20%, a realistic schedule that all stakeholders agree to support, a scope description that contains all critical elements of the widget that can be tested to indicate success and a risk assessment that is a proactive approach to managing possible future roadblocks.

D e v e l o p m e n t

Before continuing with the discussion of the development stage, it is worth noting a couple of “absences” from this particular discussion. First of all, one will notice the absence of a specific engineering tool-set or recommendation from this methodology. This was left out from the discussion as I feel that the requirements, industry and preconceived solution of a particular project predict the engineering methodology that will be used. Furthermore, the selection of an engineering design methodology is fair less important to the success of a project than the actual controls associated with the solution testing. Finally, as this is typically known as the actual innovation phase of the project life cycle, tight control of the “development” innovation is avoided to not stifle innovation and thus deliver a sub-optimized solution.

In the Development stage of our project, we will incorporate the following key aspects:

Initiate failure modes and effects analysis during design to insure a solid solution. This Six Sigma step is critical in the development stage to insure the final solution is as “bullet proof” as possible and does not deliver any surprises to your end customer. It should be noted, that this step sometimes some “out of the box” thinking to insure the project team is considering how their product could fail ... most project teams are so proud of their accomplishment they cannot begin to imagine how it could ever fail. And while this step is not specific to the actual verification and validation of a particular solution, this step should be used to initiate the testing that goes above and beyond the requirements to deliver a robust solution.

Insure a pro-active approach to project issues by driving risk management. By utilizing reoccurring risk discussion meetings to drive proactive thinking about could occur on a project; the project team is able to eliminate roadblocks earlier in a project, make critical design decisions before they impact the overall schedule/budget and leverage the entire team’s past experience to improve project execution. Additionally, this step allows the project team to openly communicate their concerns in an open forum and strengthen their relationship with their business partner.

Transition the developed solution into the business’s operating systems. While is it unusual to discuss this ITIL step during the development stage, it is critical that it occur sooner rather than later to insure the solution/widget can transition smoothly into the supply chain. This step allows the project team to “pull-in” expertise from the supply chain and avoids any material shortages, manufacturing capability shortfalls and primes the sales and marketing engine.

It is critical that the project team leave this phase with a solution that meets the customer and business expectations. Furthermore, the solution should be delivered to the supply chain in such a way that it can be manufactured and supported through accurate documentation, complete validation and verification and an educated sales and marketing team. Critical tollgates in this stage insure a complete design, a complete test suite and a solution that can be controlled/monitored in the supply chain. A successful exit from this stage by the project team is evident in the existence of controls around the solution. These controls are critical in avoiding quality escapes from the supply chain, scoping future improvement projects and educating the business on what is critical to this solution's continued success.

Operate

In the final Operate stage of our project, we will incorporate the following key aspects:

Institute control mechanism(s) to insure long term viability of the solution. This Six Sigma step is a continuation of the Development stage. The project team now must insure that the controls developed for the solution's success are institutionalized with the business and supply chain. In my experience, this is the number one place where a solution fails ... the long-term adoption of the solution. This is because the business/customer reverts back to the "old" way of doing things because no one is continuously monitoring the solution or there is no pain involved in going back. As an auditor once told me, "If it isn't being monitored or audited, it isn't happening!"

Grow the collective knowledge of the PM community by utilizing good project closure techniques. This PMI step is critical to continually raise the bar of the collective PM organization.

As the saying goes, “If you don’t understand your history, you are destined to repeat it!” This step gives the project team the opportunity to both brag about their successes and share their lessons learned with their peers to educate the community. Additionally, it requires the project team to close the loop with all stakeholders and gather the critical feedback that could lead to future projects.

Realize the need to continuously re-evaluate the “final” solution for further improvement.

This ITIL step attempts validate the paradigm that exists at the close of any successful project. That being, at the heart of any engineer, the constant pursuit of perfection and/or more features; the vain of any business leader, no project is ever done; the joy of any sales and marketing leader, more differentiated products to sell; and the anger of the supply chain, can we just fix the first solution! With the continually changing business environment and available technologies, all solutions must be continuously evaluated via their controls to maintain that solution’s market edge.

S u m m a r y

The *Project Execution Methodology* (PEM) is a step forward from the “standard” project or quality methodology because it takes advantage of “all” methodologies with no allegiance to any standards organization, quality initiative or certification body. Furthermore, the PEM does not focus only internally or externally, but determines what matters to the customer and keeps that at the forefront of the project. Additionally, the PEM recognizes the need of executives to stay informed via charts & graphs but allows the engineers to innovate and focus on the key requirements and functionality. Finally, the PEM incorporates information management to insure the “data” associated with the solution is treated as a critical output of the solution.

The PEM is organized in three stages; Plan, Development and Operate. The Plan stage focuses on understanding the customer's needs/wants, the critical few measurements that will indicate success and failure of the solution and the business strategy the must be an integral part of the solution to insure it "fits" in the business model. The Development stage focuses on the engineering requirements, the validation & verification of the solution and true innovation of the final solution. Finally, the Operate stage focuses on moving the solution into production, insuring that the initial critical few measurement improvements are being met and setting the stage for future enhancements as the customer requires.

As is mentioned throughout the PEM discussion and documented in Figure 1, a rigorous governance process supported with key milestone reviews referenced as tollgates is critical to the success of a project. These tollgates are set at specific points at time to allow all stakeholders and executives to review the project and insure it is on track and prepared to proceed. These tollgates should not be treated as a rubber stamp, but an opportunity to have a deep discussion about what has been accomplished, what roadblocks have been encountered and what deviations maybe required to fulfill the requirements. It should be noted, that the presence of an organized & structured Program Management Office can greatly improve the execution and success of tollgates.

Finally, with execution of the PEM, an organization should see dramatic improvements in their Return On Investment (ROI). This improved ROI is not only a result of the work done in the initial Plan stage when capturing the critical measurements, it is also a result of the "back-end" work done in the Operate stage when the success or failure of a project is determine against these

same critical measurements. Not only should the overall ROI of an organization's projects improve, the actual act of measuring and tracking the ROI will improve as a result of tracking the critical few measurements for a successful project. Additionally, this improved and tracked ROI will all but insure that the project team is not just delivering a product but a solution.

CONCLUSION

With the goal of improving overall project execution, the PEM was developed for the Acme Software Company. To date, the new methodology has been positively received in reviews with experts in Six Sigma, ITIL, PMI and experienced project managers. The attempt by the new methodology to leverage only the critical few tools from other methodologies has made the new methodology easy to utilize and focused. Possible areas of improvement have been included in the suggestions of additional work section. Future actions include a possible white paper for corporate level consumption and a possible pilot on some large IT projects.

RECOMMENDATIONS

In order for an organization to fully implement PEM, first and foremost, there must a knowledge base already established of previous methodologies. Experienced project managers must be knowledgeable of the PMI methodology and a few certified Project Management Professionals is advantageous to insure a firm grasp of all PMI concepts are resident within the organization. Additionally, it is absolutely required that a number of certified Six Sigma Black Belts and/or Master Black Belts be available for the initial Plan stage to insure the critical few measurements are captured and recorded. Finally, it is ideal to involve an Information Technology Professional to insure that necessary IT systems are considered when implementing the solution.

To insure that PEM is followed and that the tollgates are executed with rigor and that meaningful discussions are occurring, it is critical that a Program Management Office (PMO) be implemented. This PMO is not a project manager functional organization, but a group of project management and quality experts that can insure the ideals and key processes/tools of PEM are adhered to and utilized. While some may view this as bureaucracy and unnecessary overhead, it is absolutely critical that a form of governance be implemented to insure the project team remains focused and follows the rules ... every society needs a police person!

In addition to a functioning PMO organization, it is critical that the supporting organizations be available to make the project team “whole”. These include the necessary engineering organizations to dictate the appropriate development methodologies, a leadership/steering committee to resolve any roadblocks and approved variances to the plan and customer/stakeholder

representatives who are empowered to make critical solution related decisions. Additionally, representation from other “supporting” functions should be available at the appropriate times in the lifecycle; these include purchasing, sale, marketing, manufacturing, customer service, IT, HR and Legal.

Finally, from a supporting organization perspective, it is critical that the Finance organization play a large role in the overall execution of a project. This is not only critical from a financial accountability perspective, but also required to insure the accurate calculation and assignment of the project’s ROI predictions in the Plan stage and delivery in the Operate stage. Additionally, the Finance function serves a critical function in insuring retention of the project’s Rough Order(s) of Magnitude (ROMs), Estimates To Complete (ETC), forecasts, cost at complete and other cost metrics to not serve as an accountability/audit function but also for future project(s) reference. This is a large part of the lessons learned associated with closing out a project.

Finally, it is critical to recognize that this cultural change cannot be made overnight and in fact is a journey that may take years. Because while it may only take months to instantiate the new PEM process, the true benefit does not come until the organization’s culture accepts this process as how they do business. This part should not be treated lightly or ignored and the required change management to get an organization to accept a new way of doing things takes communication, knowledge transfer, practice and more & more communication. The HR department should be consulted repeatedly to insure the organization is prepared, the right people are in place and that the necessary follow-up for the upcoming years is done. This will require a detailed communication plan, training and a rewards/recognition system to insure adoption.

SUGGESTIONS FOR ADDITIONAL WORK

In researching the PEM topic and the associated work that had been done, a number of items were discovered that required further investigation that was not undertaken as part of this field project.

These items include:

A Change Management Methodology that prepares an organization and/or customer for implementation of the PEM and/or the impending solution created by PEM. This change management methodology is critical for the adoption of the new PEM and also for any solution created by a project team. I.E., if a project team creates the perfect solution but nobody knows or adopts/buys it, it is a failure.

Inclusion of the Lean Manufacturing principles into the development process in order to reduce the time to market. This additionally consideration was first discovered in the review of possible books for the literature review, but was excluded as it was off topic to the original premise. However, further research is required on how leverage these lean principles in actual development of a solution (Reinertsen 1997).

A deep investigation into the possible engineering development methodologies to support the execution methodology. The engineering development methodologies varying greatly from a pure waterfall methodology with a single release to the circular methodologies that create multiple releases of ever increasing functionalities (Schwaber 2004). And while the concept of delivering a

solution is ultimately the same, the engineering approach can definitely create some PEM challenges during the Development stage.

A detailed analysis and discussion of the different PMO's structures that support an overall PEM and the aforementioned tollgate governance. There are literally entire consulting organizations around the creation and management of PMO's. Highly recognized authors in the IT industry are Peter Weill and Jeanne W. Ross who recently collaborated on a book title *IT Governance How Top Performers Manage IT Decision Rights for Superior Results* (Peter Weill 2004).

Finally, it bears mentioning the absolute leadership required to implement a new way of doing anything like the roll-out of the PEM. Whether in business, sports or politics, a strong leader with a profound desire to make an impact on an organization and an iron will to see it through this difficult change is absolutely required. As far as a possible starting point for these critical essentials, one should consider authors such as Peter F. Drucker (Drucker 1999), Vince Lombardi (Jr. 2001) and John C. Maxwell (Maxwell 1998).

REFERENCES

Neuendor, Steve. 2004. *Six Sigma for Project Managers*. Management Concepts, Inc.

Den Boer, Sven. 2006. *Six Sigma for IT Management*. Van Haren Publishing.

Project Management Institute. 2004. *A Guide to the Project Management Body of Knowledge Third Edition*. Project Management Institute, Inc.

Gack, Gary A. 2008. Six Sigma and the Project Management Body of Knowledge. iSixSigma LLC. <http://software.isixsigma.com/library/content/c040721b.asp>

Zucker, Daniel. 2008. *Integrating Project Management into Six Sigma*. iSixSigma LLC. <http://www.isixsigma.com/library/content/c070423a.asp>

Jones, Stephen H. 2008. *Better Project Management Performance with Six Sigma*. iSixSigma LLC. <http://www.isixsigma.com/library/content/c060102a.asp>

Peter S. Pande, Robert P. Neuman, Roland R. Cavanagh. 2000. *The Six Sigma Way*. The McGraw Hill Companies Inc.

Harold Kerzner, Ph.D. 1995. *Project Management A Systems Approach to Planning, Scheduling, and Controlling*. Van Nostrand Reinhold.

John M. Ivancevich, Peter Lorenzi, Steven J. Skinner, Philip B. Crosby. 1994. *Management Quality and Competitiveness*. Richard D. Irwin, Inc.

Office of Commerce Government, England. 2007. www.itil-officialsite.com. The APM Group Ltd.

Corporate Executive Board. 2004. *Strategies to Improve PMO Effectiveness*. Corporate Executive Board.

Dave Pultorak, Pete Quagliariello, Rolf Akker. 2003. *Microsoft Operations Framework a Pocket Guide V3.0*. Van Haren Publishing.

Marlys Keeton Powers, Jeff Carter, Geof Lory, Andrew McMurray. 2004. *Microsoft Solutions Framework a Pocket Guide*. Van Haren Publishing.

Richard Perrin. 2008. *Real-World Project Management Beyond Conventional Wisdom, Best Practices, and Project Methodologies*. John Wiley & Sons, Inc.

Robert Slater. 2000. *The GE Way FieldBook*. The McGraw-Hill Companies.

Edward Abramowich. 2005. *Six Sigma For Growth Driving Profitable Top-Line Results*. John Wiley & Son, Inc.

Craig Gypi, Neil DeCarlo, Bruce Williams. 2005. *Six Sigma For Dummies*. Wiley Publishing, Inc.

Donald G. Reinertsen. 1997. *Managing The Design Factory A Product Developer's Toolkit*. Simon & Schuster Inc.

Ken Schwaber. 2004. *Agile Project Management With Scrum*. Microsoft Press.

Peter Weill, Jeanne W. Ross. 2004. *IT Governance How Top Performers Manage IT Decisions Rights for Superior Results*. Harvard Business School Press.

Peter F. Drucker. 1999. *Management Challenges for the 21st Century*. Harper Collins Publishing.

Vince Lombardi Jr. 2001. *What It Takes to Be #1 Vince Lombardi on Leadership*. McGraw Hill.

John C. Maxwell. 1998. *The 21 Irrefutable Laws Of Leadership*. Maxwell Motivation, Inc.

WORKS CITED

Drucker, Peter F. *Management Challenges for the 21st Century*. New York, NY: Harper Collins Publishing, 1999.

John M. Ivancevich, Peter Lorenzi, Steven J. Skinner, Philip B. Crosby. *Management Quality and Competitiveness*. Burr Ridge, Illinois: Richard D. Irwin, Inc., 1994.

Jr., Vince Lombardi. *What It Takes To Be #1 Vince Lombardi On Leadership*. New York, NY: McGraw Hill, 2001.

Maxwell, John C. *The 21 Irrefutable Laws Of Leadership*. Nashville, TN: Maxwell Motivation, Inc., 1998.

Office of Commerce Government. *IT Infrastructure Library Official Website*. January 1, 2007. <http://www.itil-officialsite.com> (accessed April 15, 2008).

Perrin, Richard. *Real-World Project Management Beyond Conventional Wisdom, Best Practices, and Project Methodologies*. Hoboken, New Jersey: John Wiley & Sons, Inc., 2008.

Peter S. Pande, Robert P. Neuman, Roland R. Cavanagh. *The Six Sigma Way*. The McGraw Hill Companies, Inc., 2000.

Peter Weill, Jeanne W. Ross. *IT Governance How Top Performers Manage IT Decisions Rights for Superior Results*. Boston: Harvard Business School Publishing, 2004.

Project Management Institute. *A Guide to the Project Management Book of Knowledge*. Project Management Institute, Inc., 2004.

Reinertsen, Donald G. *Managing The Design Factory A Product Developer's Toolkit*. New York, NY: Simon & Schuster Inc., 1997.

Schwaber, Ken. *Agile Project Management With Scrum*. Redmond, WA: Microsoft Press, 2004.

Zucker, Daniel. "Integrating Project Management into Six Sigma." *iSixSigma*. January 1, 2008. <http://www.isixsigma.com/library/content/c070423a.asp> (accessed March 31, 2008).